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SHUMAKER & SIEFFERT, P.A
1625 RADIO DRIVE , SUITE 300
WOODBURY, MN 55125

EXAMINER	
PATEL, DHAIRYA A	

ART UNIT	PAPER NUMBER
2151	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ssiplaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/670,944	PEREIRA, PRATAP	
	Examiner	Art Unit	
	Dhairya A. Patel	2151	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/24/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *17-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,21-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Application # 10/670,944 was filed on 9/25/2003. This amendment is responsive to communication filed on 10/24/2007. Applicant elected claims 1-16,21-40 without traverse. Therefore claims 1-16, 21-40 are subject to examination. Claims 17-20 are non-elected claims.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-16,21-40, drawn to a method comprising calculating traffic statistics associated with packet flows, maintaining a heap the proves a heap-ordered representation of the packet flows and processing the heap, classified in class 709, subclass 224.

   II. Claims 17-20, drawn to a method comprising maintaining a data structure to store N packet flow identifiers for packet flows, applying algorithm to process the data structure to identify the M packet flows in computational time that can be represented as less than or equal to O(Mlog(N)), classified in class 709, subclass 231.

2. The inventions are distinct, each from the other because of the following reasons Inventions I and II are unrelated. In the instant case the inventions are different as group I Claims 1-16,21-40, are drawn to a method comprising calculating traffic statistics associated with packet flows, maintaining a heap the proves a heap-ordered representation of the packet flows and processing the heap, lacking a method

comprising maintaining a data structure to store N packet flow identifiers for packet flows, applying algorithm to process the data structure to identify the M packet flows in computational time that can be represented as less than or equal to O(Mlog(N)).

Group II claims 17-20 are drawn to a method comprising maintaining a data structure to store N packet flow identifiers for packet flows, applying algorithm to process the data structure to identify the M packet flows in computational time that can be represented as less than or equal to O(Mlog(N)) lacking a method comprising calculating traffic statistics associated with packet flows, maintaining a heap the proves a heap-ordered representation of the packet flows and processing the heap.

a) The Group I search (claims 1-16,21-40) would require use of class 709 subclass 224 (not require in invention II).

b) The Group II search (17-20) would require use of class 709 subclass 231 (not require in invention I).

Applicant's election without traverse of claims 1-16,21-40 in the reply filed on 10/24/2007 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-16, 21-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima et al. U.S. patent Publication # 2003/0179705 (hereinafter Kojima) in view of Kaniz et al. U.S. Patent # 6,990,102 (hereinafter Kaniz).

As per claim 1, Kojima teaches a method comprising:

-calculating traffic statistics associated with packet flows through a network (Paragraphs 46-48);

Kojima teaches traffic counter which stores and manages a traffic counter corresponding to the packet flow in the network. The input and output traffic counter has a function of receiving a packet, transmitting a packet, counting the amount of data (number of bytes) in packet in a network.

-maintaining a heap (Fig. 4 element "traffic count table") that provides a heap-ordered representation of the packet flows (Paragraph 56);

Kojima teaches maintaining a traffic count table (i.e. heap because is a collection of data or table of data), and the traffic count table provides representation of packet flows i.e. transmission count and reception count

-processing the heap to select one or more of the packet flows (Paragraph 59-63); and

Kojima teaches processing the initial table count table (Fig. 6) to select packet flows of A and B.

-outputting the traffic statistics associated with the selected packet flows (Paragraph 59-63)(Fig. 11)(Paragraphs 66-68).

Kojima teaches outputting the traffic count and the traffic count table stores the reception count and the transmission count w/ respect to packet flow A-B w/ respect to input circuit of A and output circuit of B (outputting traffic statistics associated w/ the selected packet flows).

Kojima is silent in teaches providing heap-ordered representation.

Kaniz teaches maintaining a heap that provides a heap-ordered representation of the packet flows (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to provide heap-ordered representation of the packet flows. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree.

As per claim 2, Kojima and Kaniz teaches the method of claim 1, but Kojima further teaches further comprising: receiving a query from a client (Paragraph 64); processing the heap in response to the query (Paragraph 66); and outputting the traffic statistics associated with the selected packets to the clients (Paragraph 64-68)

As per claim 3, Kojima and Kaniz teaches the method of claim 1, but Kaniz further teaches wherein processing the heap comprises: cloning the heap to produce a heap clone (column 10 lines 11-20)(Fig. 8 element "table 1 and table 2); and extracting one or more heap entries from the heap clone to select the packet flows (column 8 lines 30-39)(column 5 lines 12-15). It would have been obvious to one of ordinary skill in the

art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to receiving query regarding M ordered packet flows, cloning the heap and extracting heap entries. The motivation for doing so decrease the time required to search an entire chain/tree since the tree is heap-ordered tree.

As per claim 4, Kojima and Kaniz teaches the method of claim 1, but Kojima further teaches wherein calculating traffic statistics and maintaining a heap are performed concurrently with processing the heap and outputting the traffic statistics (Paragraph 64-68).

As per claim 5, Kojima and Kaniz teaches the method of claim 1, but Kojima further teaches wherein calculating traffic statistics comprises maintaining a flow that stores traffic flow statistics for a set of packet flows (Fig. 4,6,9,11)(Paragraph 63,66)

As per claim 6, Kojima and Kaniz teaches the method of claim 1, but Kaniz further teaches wherein maintaining a table representation of the heap (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to maintain a table representation of a heap. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree.

As per claim 7, Kojima and Kaniz teaches the method of claim 6, but Kaniz further teaches wherein maintaining the heap comprises storing packet flow identifiers as elements of the table and in a heap-ordered fashion (column 8 lines 30-65).

As per claim 8, Kojima and Kaniz teaches the method of claim 1, but Kojima further teaches further comprising identifying the packet flows by at least one of a source network address, a destination network address, a protocol, a source port number and a destination port number (Paragraph 49).

As per claim 9, Kojima and Kaniz teaches the method of claim 1, but Kaniz further teaches wherein calculating traffic statistics comprises: receiving a packet from a network via an interface card of a network device (column 5 lines 9-15); and extracting a key from a packet (column 5 lines 12-15); associating the packet with one of the packet flows based on the key (column 6 lines 1-26) ; and updating the flow statistics for the associated packet flow based on content of the packets (column 5 lines 41-67)(column 6 lines 1-6). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to receiving packet, extract key from the packet, associate packet based on the key and update the flow statistics. The motivation for doing so would be to determine which port the packet/frame should be outputted i.e. using single port, multiple ports or all ports or no port based on the key (column 6 lines 18-20).

As per claim 10, Kojima and Kaniz teaches the method of claim 9, but Kaniz further teaches wherein maintaining a heap comprises performing a heapify operation

on the heap after receiving the packet and updating the flow statistics (column 8 lines 30-39)(Fig. 6 "heap entries").

As per claim 11, Kojima and Kaniz teaches the method of claim 1, but Kojima further teaches wherein calculating traffic statistics further comprises communicating the packets to an accounting service card of a network device (Paragraph 47), wherein the accounting service card calculates the traffic statistics (Paragraph 46-47).

As per claim 12, Kojima and Kaniz teaches the method of claim 1, but Kaniz further teaches further comprising: receiving a query from a network client, wherein the query requests M ordered packet flows; cloning the heap to produce a heap clone in response to the query (column 10 lines 11-20)(Fig. 8 element "table 1 and table 2); performing M-1 heapify operations to extract the M ordered packet flow identifiers from the heap (column 8 lines 30-39)(column 5 lines 12-15); and outputting the traffic statistics associated with the M packet flow identifiers (column 5 lines 41-67)(column 6 lines 1-6). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to receiving query regarding M ordered packet flows, cloning the heap and performing M-1 heapify operations. The motivation for doing so decrease the time required to search an entire chain/tree since the tree is heap-ordered tree.

As per claim 13, Kojima teaches the method comprising:

-maintaining a heap that provides a heap-ordered representation of packet flows within a network based on at least one criteria associated with the packet flows (Paragraph 56);

Kojima teaches maintaining a traffic count table (i.e. heap because is a collection of data or table of data), and the traffic count table provides representation of packet flows i.e. transmission count and reception count based on counting of amount of data (number of bytes) in a packet (one criteria associated w/ packet flows).

-processing the heap to output traffic statistics associated with an ordered subset of the packet flows. (Paragraph 59-63)(Fig. 11)(Paragraphs 66-68).

Kojima teaches processing the initial table count table (Fig. 6)(i.e. heap) to select packet flows of A and B and outputting the traffic count and the traffic count table stores the reception count and the transmission count w/ respect to packet flow A-B w/ respect to input circuit of A and output circuit of B (outputting traffic statistics associated w/ the packet flows).

Kojima is silent in teaches providing heap-ordered representation.

Kaniz teaches maintaining a heap that provides a heap-ordered representation of the packet flows (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to provide heap-ordered representation of the packet flows. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents.

As per claim 14, Kojima and Kaniz teaches the method of claim 13, but Kojima further teaches the criteria comprises one of a byte count and a packet count associated w/ each of the packet flows (Paragraph 46)(Fig. 4,6,9,11 "Flow table A-B")

As per claim 15, Kojima and Kaniz teaches the method of claim 13, but Kaniz further teaches receiving a query from a network client, cloning the heap to produce a heap clone (column 10 lines 11-20)(Fig. 8 element "table 1 and table 2); extracting one or more heap entries from a heap clone to extract identifiers for the ordered subset of the packet flows (column 8 lines 30-39)(column 5 lines 12-15); and outputting the traffic statistics associated with the extracted identifiers (column 5 lines 41-67)(column 6 lines 1-6). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to receiving query regarding M ordered packet flows, cloning the heap and extracting heap entries and outputting traffic statistics. The motivation for doing so decrease the time required to search an entire chain/tree since the tree is heap-ordered tree.

As per claim 16, Kojima and Kaniz teaches the method of claim 13, but Kojima further teaches wherein maintaining a heap is performed concurrently with processing the heap (Paragraph 64-68).

As per claims 21-27 respectively, it teaches same limitations as claims 1-7 respectively, therefore rejected under same basis.

As per claim 28, Kojima teaches a network elements comprising:

-an interface (Fig. 1 element 104) to receive packets flows from a network(Paragraphs 46-48);

-a control unit (Fig. 1 element 101 "control unit")coupled to the interface, wherein the control unit computes flow statistics for the packets, (Paragraphs 46-48);

Kojima teaches traffic counter which stores and manages a traffic counter corresponding to the packet flow in the network. The input and output traffic counter has a function of receiving a packet, transmitting a packet, counting the amount of data (number of bytes) in packet in a network.

Kojima is silent in teaching maintaining identifiers for the packet flows in a heap-ordered representation based on at least one of the statistics. Kaniz teaches maintaining identifiers for the packet flows in a heap-ordered representation based on at least one of the statistics (column 8 lines 30-65). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to maintain identifier in a heap-ordered representation of the packet flows. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree.

As per claim 29, Kojima and Kaniz teaches the network elements of claim 28, but Kaniz further teaches wherein the control unit maintains identifiers as a heap having plurality of entries, wherein each entry stores a respective identifier for one of the packet flows (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19).

As per claim 30, Kojima and Kaniz teaches the network elements of claim 29, further comprising a user interface to receive a query from client (Paragraph 64).

Kojima is silent in teaching wherein the control unit processes the heap in response to the query to select one or more identifiers, and the user interface outputs a portion of the traffic statistics associated with the selected identifiers. Kaniz teaches the control unit processes the heap in response to the query to select one or more identifiers, and the user interface outputs a portion of the traffic statistics associated with the selected identifiers (column 10 lines 1-35). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to process the heap in response to the query and user interface outputs a portion of the traffic statistics. The motivation for doing so would be to keep up-to-date on the network traffic statistics associated with each packet flows and its identifiers.

As per claim 31, Kojima and Kaniz teaches the network elements of claim 29, but Kaniz further teaches wherein the control unit clones the heap to produce a heap clone, and processes the heap clone to extracting the identifiers (column 8 lines 30-39)(column 5 lines 12-15). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to receiving query regarding M ordered packet flows, cloning the heap and extracting heap entries. The motivation for doing so decrease the time required to search an entire chain/tree since the tree is heap-ordered tree

As per claim 32, Kojima and Kaniz teaches the network elements of claim 29, but Kojima further teaches wherein the control unit concurrently computes the flow statistics

and maintains the identifiers concurrently with processing the heap and outputting the portion of the traffic statistics (Paragraph 64-68).

As per claim 33, Kojima and Kaniz teaches the network elements of claim 29, but Kojima further teaches wherein the control unit associates the packets with the packet flows by determining for each packet at least one of a source network address, a destination network address, a protocol, a source port number, and a destination port number (Paragraph 49).

As per claim 34, Kojima and Kaniz teaches the network elements of claim 28, Kojima further teaches wherein the control unit calculates the flow statistics (Fig. 4,6,9,11)(Paragraph 63,66) and maintains the heap-ordered representation in real-time as packets are received from the interface card (Paragraph 63-68).
Kojima does not explicitly teaches maintaining the heap-ordered representation. Kaniz teaches maintaining a heap that provides a heap-ordered representation (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to provide heap-ordered representation of the packet. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree

As per claim 35, Kojima and Kaniz teaches the network elements of claim 28, wherein the control unit comprises an accounting module that calculates the traffic statistics (Fig. 1 element 121, 123,122)

As per claim 36, Kojima and Kaniz teaches the network elements of claim 28, but Kojima further teaches further comprising an accounting service card (Fig. 1 element 122, 123), wherein the control unit forwards the packets to the accounting service card to calculate the traffic statistics (Paragraph 47-48).

As per claim 37, Kojima and Kaniz teaches the network elements of claim 28, but Kojima further teaches wherein the control unit comprises: a routing engine to maintain routing information representing a topology of the network (Paragraph 8); and a forwarding engine to forward the network packets in accordance with the routing information (Paragraph 54).

As per claim 38, Kojima and Kaniz teaches the network elements of claim 28, but Kojima further teaches wherein the network device comprises one of a router, a switch, a gateway and a hub (Fig. 1 element 102).

As per claim 39, Kojima teaches a network device comprising: an interface (Fig. 1 element 104) to receive packet flows from a network; a control unit (Fig. 1 element "control unit") coupled to the interface (Paragraphs 46-48); and an accounting service card (Fig. 1 element 122,123), wherein the control unit forwards the packets to the accounting service card to calculate the traffic statistics, wherein the accounting service card computes flow statistics for the packets (Paragraph 47-48).

Kojima is silent in teaches maintaining a heap that provides a heap-ordered representation of the packet flows. Kaniz teaches maintaining a heap that provides a heap-ordered representation of the packet flows (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to provide heap-ordered representation of the packet flows. The motivation for doing so is because heap-ordered representation is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree.

As per claim 40, Kojima and Kaniz teaches the network device of claim 39, but Kojima further teaches wherein the accounting service card comprises: a flow table to store the flow statistics (Fig. 6,9, 11) but fails to teach heap table to store the heap. Kaniz teaches a heap table to store the heap (Fig. 6 element 604 "Heap entries")(column 9 lines 59-67)(column 10 lines 1-19) It would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to implement Kaniz's teaching in Kojima's teaching to provide a heap table to store the heap. The motivation for doing so is because a heap table is easier to search in table since heap-ordered tree is an array representation in which each node has a value which is less than value of parents which will decrease the time required to search the entire chain/tree.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

5. A). "Packet Transfer apparatus with the function of flow detection and flow management method" by Yazaki et al a. U.S. patent # 7,031,313

6. A shortened statutory period for response to this action is set to expire **3 (three) months and 0 (zero) days** from the mail date of this letter. Failure to respond within the period for response will result in **ABANDONMENT** of the applicant (see 35 U.S.C 133, M.P.E.P 710.02, 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dhairya A. Patel whose telephone number is 571-272-5809. The examiner can normally be reached on Monday-Friday 7:00AM-4: 30PM, first Fridays OFF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on 571-272-3964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAP

JOHN FOLLANSBEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100